THE

VETERINARY JOURNAL

Editor :

FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E.,

HONORARY VETERINARY SURGEON TO HIS MAJESTY THE KING;
MAJOR IN THE ARMY VETERINARY CORPS.
HONORARY MEMBER OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION.
CORRESPONDANT ÉTRANGER DE LA SOCIÉTÉ DE MEDECINE VÉTÉRINAIRE DU BRABANT (BELGIUM).

Sub-Editor :

GLADSTONE MAYALL M.R.C.V.S.

JULY, 1917.

Editorial.

THE VETERINARY SERVICE IN THE FRENCH AND AMERICAN ARMIES.

Now that the Americans are definitely our Allies, and will soon be fighting side by side with us in France, it is necessary that every department turns its eyes towards them to prepare for their reception.

Amongst them the Veterinary Department must not be forgotten, and as it is at the present moment in its infancy, and really only on its trial and in process of formation, it behoves itself to profit by the mistakes of other countries.

Those responsible cannot do better than to study the organisations and defects of both their French and English colleagues, and a perusal of a translation in our present issue from an article by Professor Leclainche, can be made with profit. By this it will be seen that there is much to be avoided, and there should be no question or discussion allowed upon one fundamental point—the Veterinary Department *must run its own show*. It must be independent, and have its own command. To be subordinate to any other department whatever is derogatory, and not for the good of the Army. It is a department as important and essential to the success of the service as any other, and, although not quite so large as some, it cannot be done without.

The French system is totally different to the English one, and, as will be seen by a perusal of Prof. Leclainche's article, it is not so satisfactory either to the personnel or to the officers of the corps as the English organisation. To be under the command of a combatant officer, often an old "dug out," is not conducive to good work, especially if the officer happens to be a self-opinionated man. The Medical Department is to have a controlling influence over the

Veterinary Branch of the American Army, and whether this will tend to success or otherwise remains to be seen.

The English method is much the best, and the great success of the British Veterinary Hospitals is a proof of it. Here we have thousands of men and horses, established in large camps, fed, rationed, watered, and medically or surgically treated, entirely under the command of veterinary officers—men with veterinary qualifications whose business acumen is tested every day.

The system, too, of appointment of veterinary officers to units is most excellently carried out, and the sick or injured horse has every possible opportunity to get well by rapid evacuation to a base hospital, The unit veterinary officer does prophylaxis and first-aid treatment, passing the animal on to Mobile Veterinary Section for transit to the base, under the guidance of the Assistant Director of Veterinary Services, who in his turn is responsible to a Deputy-Director of Veterinary Services, and finally to the Director-General.

To have to consult combatant officers as to whether or not certain things should (or can) be done, means serious delay, and probable loss of life ; and, besides, the show should be our own, and we are quite capable of running it !

Let the Americans take warning of the many errors made by France and by England in the past, and get a real, strong start. That is what is wanted, and that is essential as a foundation.

We wish our Allies luck in their efforts to rise on a firm foundation, and they can each rest assured that they have the individual support of their British and Colonial colleagues.

General Articles.

THE VETERINARY OFFICER IN THE UNITED STATES ARMY.

From "The Amer. Journl. of Vet. Med." for May we learn that the veterinary corps of the army was established by Act of Congress on June 3rd, 1916. The allocation of veterinary officers as provided by law is not more than two for each cavalry regiment, one for three batteries of field artillery, one for each mounted battalion of engineers, seventeen as inspectors of horses and mules and as veterinarians in the quartermaster corps, and seven as inspectors of meat.

Applicants for service must be between the ages of 21 and 27. They have to undergo a rigid examination as to intellectual and physical qualifications, and they must be graduates of a recognised veterinary college or university. Six days are usually taken up in the examination of the applicants by a board consisting of three medical officers and two veterinarians.

Assistant veterinarians are commissioned with the rank, pay

and allowances of a second-lieutenant of cavalry, which amounts to pay of $1,700 per annum, with quarters, light, fuel, medical, dental and hospital service free, and a month's vacation each year. After five years' service they are eligible for first-lieutenants at $2,000 per year; and after 15 years for captains, and after 20 years for majors, at a maximum salary of $5,600 a year. After each five years' service up to twenty years the pay is increased 10 per cent. A captain with fifteen years' service will receive $2,400 plus 30 per cent., or $3,120 per annum, with allowances. The retiring age is 64.

A defect in the present constitution referred to in *The Journal of the American Veterinary Medical Association* is that no provision has been made for a Veterinary Reserve Corps. The age limit as laid down by law will hardly produce a sufficient supply of veterinarians for the present emergency, but no doubt revision of this instruction will be made if occasion requires and it is proposed that "for the purpose of securing a Reserve Corps of Veterinary Officers for military service as temporary officers in the regular Army, the President be authorised to issue commissions to citizens of the United States who are graduates from a reputable veterinary school, under such restrictions and with the same rank as is given to officers of the Medical Reserve Corps."

REMARKS ON THE FRENCH ARMY VETERINARY SERVICE.*

By M. E. LECLAINCHE,
Inspector-General, Head of the Sanitary Services to the Minister of Agriculture.

THE organisation of the veterinary service of the army is now being discussed in the limited number of professional journals which have survived the state of war.

Of the few accounts given all coincide in being unfavourable; the Army Commission of the Senate has judged certain procedures severely and drawn up parliamentary statements involving grave criticism of various subjects. The public press has widely taken up the question. In addition we possess the advice of allied or neutral authorities. In saying that the English do not at all regret never having adopted our methods, I only interpret in a slight way their kindest appreciations. Comparing the French and English services after a visit to the front, Marshall, the American, thus records his impressions: "The French Veterinary Service was not suitably organised and prepared before the outbreak of hostilities. They have not had time to deal with these questions since." The irony is cruel; but the view is just. The foreign military missions which recently visited our Depôts des Chevaux Malades could not conceal

*Translated from the *Revue Générale de Med. Vet.* (G.M.)

the unfavourable impression which the working of these establishments gave them. It is quite certain that the actual organisation, with innumerable regulations arranged for peace time, does not answer at all to the present exigencies which nobody had foreseen.

The conviction had established itself that the veterinary service would be non-existent in time of war. The short campaign counted on need not concern itself, it was thought, with the care and maintenance of horses. This extraordinary answer of a certain veterinary surgeon may very well be quoted. A soldier expressed astonishment during the first days of mobilisation at the absence of all therapeutic material. The veterinarian said: "With a revolver and some salt water the veterinary surgeon on campaign has all that is necessary to fulfil his mission." One of the most distinguished veterinarians in the army wrote to me some years ago: "To keep the cavalry in a good state is our essential and only mission; our part in the campaign will be *nil*; every horse that cannot follow ought to be sacrificed on the spot."

I bring forward these recollections without any mental reservation. One could not ask the veterinarians to profess any opinion other than that of their great army chiefs on the general conduct of the war.

But whilst under the pressure of events every arm and service has abandoned some faulty ideas and obsolete methods, the veterinary service has preserved intact its dogmas and regulations.

In the presence of an unforeseen task for which it was not at all prepared, the veterinary service had to reorganise entirely. It had to replenish all its departments; a great work might have been accomplished; it could have rendered striking services to the army and to the country. In the face of new conditions, it had to establish the rules of hygiene of a formidable cavalry, and to determine simple and effective methods of treatment; the creation of field hospitals, of lazarets, of surgical centres, the economic use of convalescents and incurables, the organisation of the remounts in this and foreign countries, marine transport, investigation and prevention of exotic maladies, the care and sanitary supervision of the stock in the military parks, the control of home and imported meat, and that of preserved stuff in France, and in the new sphere, the management and preservation of meat, the different operations of the tripe house and pork butcher, and the recovery (which is so valuable) of the bye-products of the abattoir and horse-slaughterer. All these demanded full activity on the part of veterinarians, and the employment of every expert available.

The men capable of directing each of these services were known by everybody, and marked down at once by their previous situations and by their work. It is doubtless futile to indulge in recrimination;

but is it not lamentable to see veterinary surgeons sent at great cost to buy horses in America who have specialised in the bovine clinic, or in vine culture; to see appointed, under still more strange conditions, a controller of the manufacture of preserved stuff in South America; to see the inspection of frozen meat at a large port entrusted first to a Parisian drayman, and then to an automobile manufacturer!!

The organisation of the Depôts des Chevaux Malades is a defiance of all the rules of common sense. The maintenance of useless, costly and injurious staffs acts and reacts against us. The juxtaposition of infirmaries and mobile remount depots has had consequences foreseen by veterinarians from the very first day; thousands of healthy horses have contracted mange and lymphangitis, to spread them afterwards in the corps or in the country. Can one admit for a moment that an autonomous veterinary service would have committed such blunders?

One knows the stolid answer returned to Mons. Deputy Brousse when he asked: "What reason is there for keeping so many cavalry commanders and lieutenants in command of depots at the back of the lines?" "It is because military regulations prescribe that the object of the veterinary service in the field is to ensure the care of horses, but not to exercise any control over horse depots."

This recalls to me the joke of an army veterinary surgeon reviewing his impressions after eighteen months campaigning: "Our rôle can be defined by the following decree:—Art. 1.—The veterinary service in the field is non-existent. Art. 2.—The inspectors of remounts are appointed to see this present decree carried out."

No technical direction—a veterinary inspection merely a matter of occasional advising, ignoring all personnel, stoically endorsing responsibilities which nobody deems incumbent upon him to carry out. No active committee capable of furnishing indispensable advice. No centralisation and direct utilisation of the numerous teachings which the experience of war furnishes. At the C.Q.G. a cavalry officer, allocated as a figure to the position of Director of Service, who gravely annotates some reports on the pathogenesis of glanders; some army principals receiving no other inspiration than that of their own experience, unravelling them as they can, provided with vague attributes, and merely tolerated by the command. In some regions, directors of mature age, watching that no initiative disturbs the established order and their quietude, masters at the preparation of impeccable "lists" placed under the all-powerful protection of the local command. Above all an encumbering and sterile mass of waste paper; reports which nobody reads, statistics which nobody believes, some "lists of losses" reduced by thousands, in triplicate, signed,

XUM

overlooked, and certified by multiple authorities, concluding solemnly by putting all animal death to the expense of the State.

"With the hard experience of a war so prolonged," says Mons. Henri Paté, "and in order to galvanise the system into life, the command must borrow the most active types of organisation, of division of work; one still sees the army over-weighted with a store of superfluous machinery, and with offices held by men who exercise no useful rôle."

Will the reorganisation of the veterinary service be realised at last? Will the service leave Parliament once more to take the initiative? A near future will tell us. In any case the essential principle of reform is easy to indicate.

Give to veterinary inspection, under the authority of the Director of Cavalry, the technical direction of all that concerns hygiene, and the treatment of the animals of the army and utilisation of animal products; give him, under the same authority, all powers as regards the redistribution and the better utilisation of personnel. Assisted by advisers that he will appoint, the veterinary inspector could give the necessary directions; he could exercise by himself, or through his delegates, the necessary controls. He could send back to agriculture, which can no longer do without them, the 500 veterinary surgeons that have been called up.

This is what must be realised, not to satisfy egoistic interests which are of little account at the moment, but for the safeguarding of the interests of the country. G. M.

Original Communications.

"STOMATITIS CONTAGIOSA" IN HORSES.

By A. C. Burton, M.R.C.V.S.,
Captain Army Veterinary Corps.

It is a contagious disease characterised by vesicular eruptions in the mouth with subsequent more serious and characteristic lesions therein; similar lesions on m.m. of œsophagus and stomach, with an acute gastro-enteritis: occasionally, also, an eczematous coronitis.

There is no doubt that the condition is different from the disease described by Friedberger and Frohner as stomatitis contagiosa pustulosa. The symptoms, duration of disease, the actual lesions and prognosis, cannot be compared. There is apparently little literature on "Foot-and-Mouth Disease in the Horse."

Horses readily contract the disease. Mules are not so susceptible, but are by no means immune. It is transmissible to man—my Staff Sergeant, a Corporal dresser, and myself have contracted it. Here

the disease was of short duration, and to be described as mild, though very painful, confined to the mouth with symptoms and lesions similar to those to be described.

We have still no definite knowledge of the nature of the virus. Much work in this direction is now before us, and the results may be of far-reaching importance. It must be presumed that the virulent material is contained in the vesicles in the mouth, and thus in the saliva; also, from the gastric lesions, in the excreta, as well as in the vesicles and serous exudate of the foot lesions. Thus the possible media to affect healthy animals are very numerous, and we have abundant proof of the easy communicability.

The virus seems to be easily destroyed—both foot and mouth lesions are speedily arrested with the aid of mild antiseptics; my own case answered readily to simple treatment. There seems evidence that the material from mouth and foot lesions is inactive after forty-eight hours.

There is reason to think that the period of incubation is short, twenty-four hours to three days. Further research should enlighten us on this and other points.

Any immunity conferred by an attack appears to be of short duration only. Re-infection has taken place in less than two months (or, was it that "recovery" from first attack was only "apparent" and not complete?). It is not a benign disease; under certain conditions it is malignant, with both serious and fatal terminations.

It seems probable that sudden outbursts of the disease are influenced by climatic or other conditions. Or, is it severe weather, exposure, and harder work are sufficient in themselves to lower the natural resistance to this disease?

All classes of horses are affected—heavy draught, light draught, and riders. Age is not a factor—young horses contract the disease as readily as the old. Mules are not so frequently affected, they are by no means immune. Recovery in the mule is longer delayed. Generally speaking, the "condition" of the animal seems to play a great part in the "progress" of the disease.

SYMPTOMS.

The initial symptom is an inflamed condition of the mucous membrane of mouth or lips. This is speedily followed by the formation of vesicles. These vesicles:—

(*a*) *Of the lips*—show a preference for the margin of skin and mucous membrane, are in this position, small and have a tendency to rupture quickly rather than to coalesce before rupturing. A straw-coloured serum is exudated, and gives a "crusted eczematous appearance," which may extend from the one angle of the mouth to the

other, on either or both lips. A few such vesicles may appear on the skin itself. They are quite common on the mucous membrane well away from the margin of skin and m.m., and in this site are larger and frequently coalesce before bursting. The resultant lesion is irregular in contour, may be just superficial, or deep and ragged, extending almost throughout the substance of the lip. The latter must not be considered of traumatic origin.

(*b*) *Of the gums*—quite common, especially at the base of the incisors, in which position the resultant lesion is small in extent. Away from the teeth the subsequent lesion is inclined to be larger, more irregular in shape, deeper and more ragged and will extend to the bone.

(*c*) *Of the upper and lower palate*—quite common, but the resultant lesions are not as a rule so severe, are generally in the neighbourhood of the incisors. The " bars " are a favourite site, and here the lesions are, at times, of considerable area.

(*d*) *Of the mucous membrane of cheeks*—not uncommon, but do not tend to a severe type. They (the resultant lesions) give the appearance of injuries by molar teeth, but must not be confounded with such.

(*e*) *Of the tongue.*—Here they are the most severe met with in the mouth. They are nearly, if not always, secondary to one or more of those already enumerated. They coalesce freely, and the resultant bleb is of considerable area. It is seldom that the vesicles or blebs are seen on the tongue, for they burst almost on formation. The mere handling of your patient and its tongue is sufficient to cause the rupture, and the epithelium comes right away ; this leaves an angry-looking raw patch. The dorsal surface is that most frequently affected ; sometimes the edge of the tip of the tongue is alone affected. Some severe lesions of the tongue must be noted, viz., where practically the whole of the dorsal surface of the tongue is denuded of epithelium.

All the foregoing lesions vary in severity ; but it is not noticed that the severity of same is in direct relation to the emaciation of animals—that is, a good condition animal may show very severe lesions ; a greatly emaciated animal may only show slight lesions. All the animals show a marked resistance to the handling of their mouths and lips. This would appear only natural where the lesions are severe, but it is general, tending to prove that the affection is a more painful one than the lesions at times would suggest.

Salivation is both variable and recurrent. Some animals will not salivate throughout the course of the disease. With lip lesions only salivation is rare. It is sometimes the first symptom where the buccal mucous membrane is inflamed, but no characteristic lesion has

yet developed. It will cease, only to recur at intervals of a few days to a few weeks, and will even take place one month after definite diagnosis. Roughly, salivation may be said to take place only where tongue lesions exist. The profuseness of salivation, however, is no indication of the severity of the lesions.

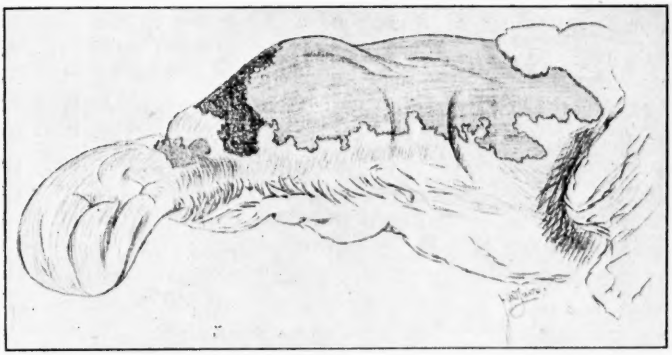


Fig. 1.—Typical fresh lesions on the Tongue.

Fig. 2.—Partly healed Lesion on the Tongue.

In a great number of cases, and in practically all severe ones, the odour of the mouth is very offensive. It is not merely a sour smell—as one would meet in cases of ordinary digestive derangements—but a stench more akin to that of the breath of an animal suffering from gangrenous pneumonia.

Colic is a frequent symptom, more especially in cases running an unfavourable course, and is here due to gastro-enteritis, a notable feature of the disease.

In a few cases the disease has been accompanied by icterus, but probably the latter has been due to causes other than stomatitis.

Pulse.—A rapidly-falling one, till, in the emaciated, it is scarcely perceptible. Visible mucous membranes highly injected.

Temperature.—Fever is present only in these very severe cases and in those where abdominal lesions supervene, and then may reach 103° or 104°. Provided the mouth lesions are not severe, the appetite remains good; there is little or no constitutional disturbance, and no appreciable ill effects. On the other hand, severe lesions either of lips or tongue are of themselves sufficient to *prohibit feeding*, and your patient wastes rapidly. It is not so much that the appetite fails, but that prehension of food is rendered difficult and painful. Although a fat animal may waste very rapidly, from either tongue or lip lesions, it must be noted that (1) recovery in such animals is usually more rapid; (2) an unfavourable course with gastro-intestinal affection is less common, *i.e.*, the condition of the animal plays a great part in the progress of the disease. With the healing of the mouth lesions, recovery may be uninterrupted and complete. The healing process varies from a fortnight to two or three months; but one cannot be sure of recovery having taken place, as lesions further on in the alimentary track are very common, and will develop at variable intervals, viz., at one and the same time as those of mouth, also after complete healing of the mouth lesions; one may say, from ten days to a month or longer after the initial mouth lesions. It must be noted that an animal may apparently make a recovery as far as can be judged from mouth lesions, will feed again well, but will continue to waste, *i.e.*, it will continue to lose condition for reasons other than an insufficiency of food being taken. Here one may suspect, especially if accompanied by colic, that a gastro-intestinal affection has taken place. It is, of course, obvious that in cases of complete recovery one can give no proof of a gastro-intestinal affection having taken place. Healed mouth lesions are quite common in animals both with and without a history of stomatitis. It is noteworthy that *healed* gastric lesions have so far been met only (*P. M.* examinations) accompanied with active lesions, *i.e.*, there is yet no conclusive proof of gastro-intestinal affection with subsequent recovery.

Foot Lesions. — Best described as an *eczematous coronitis*. They are no doubt a symptom of the disease under review. A synthetic analysis will not permit any other conditions to account for their presence. The affection is seen in one or more feet, is very painful, and develops rapidly. An animal sound one day will be acutely lame the following; vesicles appear almost at once, rupture, and the straw-coloured exudate trickles down the wall of the hoof. The heel is the part most often primarily affected, and from here it spreads rapidly round the entire coronet at times. The serum coagulates and gives the appearance of a thick crust or rash round the part. Where present, a distinct separation of horn from skin results,

and this is of considerable depth. Where all four feet are affected, locomotion is most difficult and painful.

These lesions manifest themselves at variable times, but invariably at the "commencement" of the disease. They are observed at the same time as diagnosis of mouth lesions; or at variable intervals from two to eight days, after those of the mouth. Again, foot lesions are recorded in cases of what was considered a second attack. These lesions, like the mouth lesions, resemble foot lesions found

FIG. 3.—The Lesion on the Coronet.

in the foot-and-mouth disease in cattle. These foot lesions have not yet been observed in cases where symptoms or lesions of the disease were not found in the mouth.

DIAGNOSIS.

Sufficient has been stated under previous heading to render diagnosis easy.

PROGNOSIS.

Must be guarded. The disease too frequently runs an unfavourable and even fatal course.

POST-MORTEM LESIONS.

All the ***ante mortem*** lesions, so far described, may be found in one stage or another. Where very severe mouth lesions are present

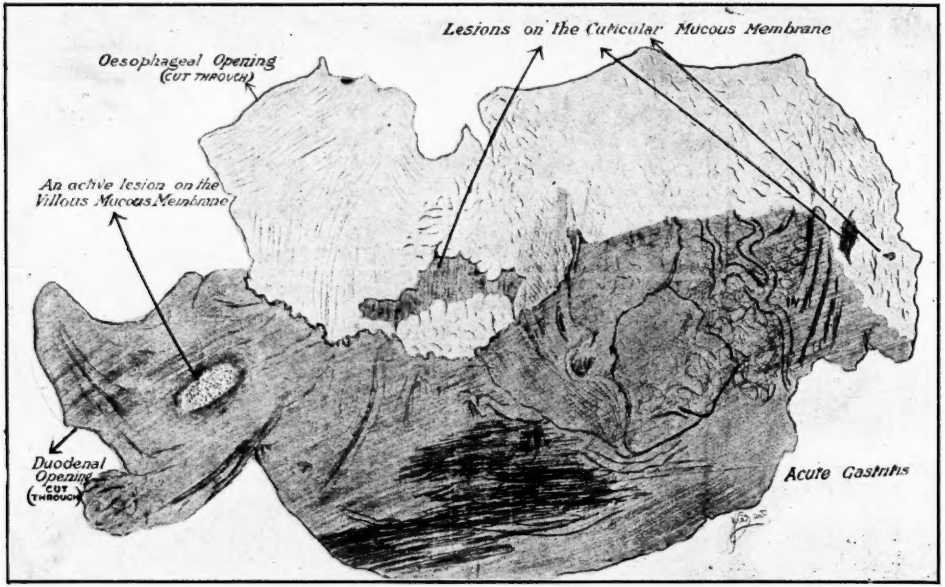


FIG. 4.—Stomach Lesions found in the same animal as the Tongue Lesions of Fig. 2.

and still active, the alimentary tract may be found completely devoid of food stuff.

Emaciation is marked. Mouth lesions may be quite recent and extensive, or completely healed. At times the acute inflammation has subsided, but the epithelium has not repaired itself. Where the mouth has allowed normal feeding, the stomach and intestines are found well supplied with foodstuff, but the carcase, nevertheless, emaciated.

Lesions, as on the tongue and lips, may be found on the mucous membrane of the œsophagus. They are quite common in the stomach, and here, again, will be found to vary both in severity and age, as also in position ; but are invariably of same character as in mouth. Their favourite site is the junction line between the villous and cuticular mucous membrane, but may, and do, invade either or both mucous membrane.

Where gastric lesions are present, gastro-enteritis is invariably found, and of a more acute form than that seen in our animals due solely to digestive derangement or other milder troubles.

The characteristic lesion of the disease has not yet been found in the intestines. One may assume that the gastro-enteritis, if not due to the actual presence of the specific organism, is due to the poisons elaborated by them, and these latter may also account for the spasmodic convulsions and tetanic symptoms seen in the last stages of the disease.

Treatment.

At times one meets with cases where treatment is of no avail. Local treatment, *i.e.*, to mouth, is not only indicated, it is of great value. It not only *cures* the milder lesions, but it will arrest the more severe ones and prevent the case taking an unfavourable course with subsequent gastro-intestinal affection. Of drugs, Pot. Permang., Pot. Chlor., Alum, and Cupri. Sulph., have a beneficial effect. The use of a caustic is contra-indicated. It would appear that any antiseptic, and that of weak strength, is sufficient for our purpose as the virus seems very easily destroyed by the most simple one. Frequent irrigation and cleansing of the mouth is the treatment rewarded with best results.

After trials of electuaries, mouth washes, etc., of the drugs mentioned and others, there remained ample room for improvement. Our present mode of treatment has given very satisfactory results. To commence with, the most serious cases were put together in one stable ; all animals of one side were treated in the manner to be described ; the animals on the other side (practically head to head) were treated by other means and purposely, in some cases, not treated at all.

Very marked improvement was noted in those animals treated thus: Three, four, or as many times a day as circumstances permit, the dresser walks down the gangway in front of the horses' heads. He carries on his back the ordinary Vermorel sprayer containing 5 gallons of clean, cold water to which has been added ½ ounce of Pot. Permang. The nozzle of the sprayer is covered with a piece of rubber hose pipe, through the end of which several holes have been made. Neither the lips or mouth is touched by the hand, but the animal held by the head collar, the rubber nozzle is passed between the lips at the corner of the mouth and into the mouth. The pump is worked, and the mouth is thus thoroughly irrigated and cleansed. The animal, far from resisting this, much appreciates it, and actually manifests this appreciation. The results are such that one need look no further for treatment. A plentiful supply of clean, cold drinking water is used to the best advantage by these patients. It will readily be understood that soft and semi-liquid foodstuffs alone can be used; for this purpose crushed oats, a little bran, and a few roots, with the addition of linseed, well boiled and mixed, suits admirably, and can be of different consistency to suit the case.

It must be remembered that my remarks have referred, in great measure, to the disease in already debilitated animals. There is evidence that the disease answers more readily to treatment in cases of good condition animals.

I attach sketches of the lesions found; those of the tongue and stomach are from one and the same animal, and drawn soon after destruction.

TUBERCULOSIS IN THE HORSE.

By F. CHAMBERS, F.R.C.V.S.
Capt., Army Veterinary Corps.

During the last six months four cases of tuberculosis have been observed. The diagnosis was only made on *post-mortem* examination. Tuberculosis is known to be so rare in the horse that one seldom suspects the presence of the disease unless the animal exhibits that marked stiffness of the neck, caused by an ostitis and periostitis, which has become to be recognised as a striking symptom of this disease in the horse. All the four cases which I have recently observed were, with the one exception, sent to the hospital as cases of debility. The exception was admitted for sand-colic. It was a grey gelding, 10 years old, in very poor condition, and purging badly. The usual treatment for sand-colic was prescribed but with little result. Eight days after admittance this animal developed symptoms of acute pneumonia in the morning, and died the same evening. *Post-mortem* examination revealed a quantity of sand in the first

portion of the large colon. The mucous membrane of the last few feet of the large colon was wrinkled, and the coat of the bowel was considerably thickened. The mesenteric glands were much enlarged. Spleen and liver normal. There were two gallons of fluid in the thoracic cavity. The lungs were adherent in places to the chest wall, and congested; the pleura adjoining the heart was much inflamed. The pericardium was one inch in thickness and adherent in places to the lungs, and the amount of pericardial fluid was slightly increased. Smears were made from the pericardium and interior of the mesenteric glands, and tubercle bacilli were found in great numbers. The other three cases were purely abdominal, and a description of the one will answer for all three. During life the symptoms exhibited were those of debility with progressive weakness. No diarrhœa was observed. All three cases were destroyed, as no improvement was noticed after three months' treatment.

Autopsy.—Excess of fluid in abdominal cavity. The stomach and intestines appeared normal, except that the mesenteric glands were much enlarged, and firm in consistency. No caseating or calcareous areas could be found in any of these glands. The spleen was enlarged and filled with tubercles ranging in size from 5 mm. to 4 cms. in diameter. They were grey in colour, firm to the touch, and many contained caseous material. The liver appeared to be normal, but the portal gland was enlarged. Lungs and bronchial glands normal. Heart normal. Brain and spinal cord not examined. Smears in all cases were made from the cut surface of the mesenteric glands and caseating areas in spleen and tubercle bacilli were readily found and were numerous.

During life tuberculosis was not suspected in any of these cases, and I have put these cases on record as I consider that it would save time and expense if all cases of debility that do not make headway in a few weeks were tested for tuberculosis. One cannot consider that tuberculosis in the horse is by any means common, but I am inclined to think that it is much more prevalent that is usually thought.

THREE CASES OF EQUINE SARCOPTIC SCABIES IN MAN.

By Thomas Parker, F.R.C.V.S.

Veterinary Officer for the City and County of Newcastle-upon-Tyne.

In Neumann's standard work (Dr. George Fleming's translation) on the parasites and parasitic diseases of the domesticated animals, under the heading of "Communication of the Sarcoptic Scabies of the Horse to other species of Mammals," it is stated as follows:—

"(*a*) *Man.*—The sarcoptic scabies of the horse may be transmitted to man, although this occurrence is comparatively rare."

XUM

" (*b*) *Domesticated Animals.*—Sarcoptic scabies of the horse appears to be capable of transmission to the bovine species, although up to the present time no one in practice has observed this form of mange on cattle. . . . Neither is there any more authority for stating that horse mange may be communicated to the sheep, goat, dog, etc,"

Before proceeding further, I would like to point out that in March, 1900, McFadyean placed on record (" Journal of Comparative Pathology and Therapeutics ") a case which had enabled him to demonstrate, by positive evidence, the existence of sarcoptic scabies as affecting the bovine species.

Neumann quotes a number of interesting cases where man had contracted the disease from the horse. The following cases which have come within my own experience may be of some interest :—

(*a*) Between June 6th and 20th, 1902, whilst on duty at the Field Veterinary Hospital, Kroonstad, Orange River Colony, South Africa (during the South African campaign), I had charge of—besides other cases—a large number of horses and mules affected with scabies. For some reason or other a commanding officer doubted the contagious nature of the disease, and with the view of removing that doubt, I proceeded to one of the kraals in which were between thirty and forty horses very badly affected, but which, fortunately for the particular object in view, had not been subjected to any treatment. With sleeves rolled up, I took a number of deep scrapings, and then immediately went into the surgery and prepared a few specimens on slides with glycerine. On examination under a low power, numerous live acari belonging to the genus sarcoptes were found. Within a day or so both my arms began to be very itchy, followed by the development of well-defined hæmorrhagic spots. The irritation appeared most when exposed to the hot sun, and during the night. In the course of a few days the eruption subsided, and gradually disappeared, the only treatment adopted being a liberal application of soap and water. Some days later, whilst daily castrating horses, my hands and arms were frequently washed in a solution of perchloride of mercury, and the irritation previously experienced never returned.

(*b*) In January, 1916, whilst making enquiries into the history of an outbreak of sarcoptic scabies affecting a number of horses in each of two studs within the city, it was found that the groom, who had been attending the horses of one stud, had some weeks previously reported his suspicions of mange to his superior officer. A veterinary practitioner was then called in, and, after making an examination, prescribed a physic ball, the condition being considered one of a temporary nature due to some dietetic trouble. Some days later the groom noticed the development of a number of small spots on his fore arms,

accompanied by severe itching. These, however, gradually disappeared after being subjected to treatment for some days. In the meantime, the disease continued to make progress on the particular horse concerned. Finally, one morning the animal, whilst endeavouring to scratch its head with the off hind foot, got the calkin of the shoe fixed to the halter shank, and fell and was injured. The veterinary practitioner was again called in, and on this occasion quickly recognised the existence of suspected parasitic mange, and, without further delay, reported it to the local authority, hence my visit.

(*c*) On April 3rd, 1917, in response to a telephone message, I visited a stable within the city and examined a stud of ten horses. Of these, eight were found affected with mange, the clinical symptoms being typical of sarcoptic scabies. In the majority of cases the lesions were distributed over the head, neck, shoulders, withers, chest, loins and croup regions. Deep scrapings were obtained from two of the animals and on examining these microscopically sarcopts were found present, which placed the nature of the condition beyond all doubt. On visiting these premises a few days later the horse-keeper came to me and asked what I thought was wrong with his arms. Both fore arms presented numerous hæmorrhagic spots, which he stated were very itchy, and most particularly after he went to bed each night. The condition presented in this case was very similar to those of the two previously described cases, particularly in that the sensation of itchiness was aggravated by warmth, and that the condition was comparatively quickly got rid of by simple treatment. Furthermore, the lesions were in all cases present on the fore arms, and in the latter case they were present behind the right shoulder, and on the shins—probably spread there by the patient himself.

THE TEMPERATURE REQUIRED FOR THE "INACTIVATION" OF MULE BLOOD FOR THE COMPLEMENT FIXATION TEST FOR GLANDERS.

By J. B. BUXTON, F.R.C.V.S., D.V.H.,
Herne Hill, S.E.

During the past two years it has been necessary to test blood samples from a large number of mules for glanders by the complement fixation method. It was found early in the course of these tests that an unusually large number of animals gave a definite positive or indefinite reaction. Control tests by means of the agglutination reaction were frequently indefinite, there being a partial clumping of the organisms in all dilutions sometimes as far as the ninth and tenth tubes. The subcutaneous mallein test could not be accepted as definite owing to the occasional occurrence of large œdematous swellings at

the seat of inoculation, although these swellings did not present the characteristic of a typical mallein reaction. The intradermo palpebral reaction was usually found to give consistent results. *Post-mortem* examination of certain animals which had given a positive reaction to the complement fixation test failed to reveal the presence of glanders lesions. The indefinite reactions to the complement fixation test suggested that the mule serum had not been sufficiently inactivated, although it had been heated for half an hour at 58° C., and that the anti-complementary bodies had not been destroyed.

The following experiments were therefore carried out to determine at what temperature and with what period of exposure to that temperature the necessary degree of "inactivation" was obtained.

Mule.	Temperature to which serum was heated.	Length of time subjected to heat.	Hæmolysis.	Result.
1	58° C.	½ hour	—	Inactivation incomplete.
2	,,	,,	—	,, ,,
3	,,	,,	—	,, ,,
4	,,	,,	—	,, ,,
5	,,	,,	—	,, ,,
6	,,	,,	—	,, ,,
7	,,	,,	—	,, ,,
8	,,	,,	—	,, ,,
1	60° C.	½ hour.	+	,, complete.
2	,,	,,	—	,, incomplete.
3	,,	,,	—	,, ,,
4	,,	,,	—	,, ,,
5	,,	,,	—	,, ,,
6	,,	,,	+	,, complete.
7	,,	,,	—	,, incomplete.
8	,,	,,	+	,, complete.
1	60° C.	1 hour.	+	,, ,,
2	,,	,,	+	,, ,,
3	,,	,,	—	,, incomplete.
4	,,	,,	+	,, complete.
5	,,	,,	+	,, ,,
6	,,	,,	+	,, ,,
7	,,	,,	—	,, incomplete.
8	,,	,,	+	,, complete.
1	62° C.	½ hour.	+	,, ,,
2	,,	,,	+	,, ,,
3	,,	,,	+	,, ,,
4	,,	,,	+	,, ,,
5	,,	,,	+	,, ,,
6	,,	,,	+	,, ,,
7	,,	,,	+	,, ,,
8	,,	,,	+	,, ,,

The blood samples in the above test were obtained from mules which had failed to show a reaction to the intra-dermo palpebral test, and had failed to react or had given a non-characteristic reaction to the subcutaneous and agglutination tests. Two of the above animals had failed to show glanders lesions on *post-mortem* examination.

The serum from a mule known to have had glanders was then tested as follows :—

Mule.	Temperature to which serum was heated.	Length of time subjected to heat.	Complement fixation titre.
a	60° C.	1 hour.	·02
	62° C.	½ hour.	·1

The above experiment demonstrated the fact that, while the lower temperature failed to completely inactivate the serum, the higher temperature did not destroy the specific antibodies, while destroying the anti-complementary bodies.

It was subsequently found that while an exposure of 10 minutes at 62° C. failed to completely inactivate the serum of a non-glandered mule, there being incomplete hæmolysis, as shown by a faint haziness, with quantities of ·2 and ·1 cc. of serum respectively, an exposure of 15 minutes at the same temperature was sufficient to produce complete hæmolysis with all dilutions.

As no reference has been found in current literature dealing with this peculiarity of mule blood the foregoing note is published with a view to the prevention of a similar indefinite result in the testing of mule serum by the complement fixation method.

DROPSY IN SHEEP.

By R. HUDSON, F.R.C.V.S., *Retford.*

THE occurrence in camels of a kind of dropsy of the tissue as the result of drinking water after long abstinence reported in the VETERINARY JOURNAL for May by A. S. Leese, F.R.C.V.S., calls to mind a case I had in a flock of ewes.

Being at a farmer client's one evening when word was brought in that two sheep of a flock were showing difficulty in breathing, and were swollen about the nose, we decided to drive over and see them. On the way I learnt that the ewes had been sent to another farm two or three days previously—a distance of 7 or 8 miles. The lambs had been weaned before they went, and the ewes kept near home for two or three days, grazing lanes with a view to giving them exercise and preventing udder troubles.

On arriving at the field I found it a very bare, burnt-up pasture, a water-barrel near the water supply, the water being run into a trough holding about 8 gallons.

XUM

The first sheep to be examined was down, breathing with great difficulty owing to swelling about the nostrils. This swelling extended over the region of the submaxillary space, cheeks, lips, and nose; was painless, ; pitted on pressure. Around the nostrils mucus had accumulated and dried, making respiration still more difficult. The membranes were pale, ears cold, fever absent.

The next sheep examined showed similar symptoms, though not quite as bad; and on going through the flock many were found to be swollen under the jaws (chockered) and about the nose, but they were feeding, and appeared all right otherwise.

I was puzzled to know what the cause of the dropsy might be, and must own that the owner and myself got a perfect fright.

It did not appear possible that the two ill sheep could live long. Many others—probably half of the 200—were in some degree affected, and might develop worse symptoms.

Slaughter of the two seemed the best thing to do, but there was nobody to do it, so we decided to leave them alone until morning.

On the way home we called at an old farmer's, and asked him if he had had similar trouble; but, with the exception of one case of "swelled head" in a sheep, he could not remember anything of the kind, and he had been there about fifty years.

Visiting early next morning, I was surprised to find the two ewes (which should have been dead) grazing, and looking all right except for slight fulness about the muzzle. Difficulty in respiration had vanished, and they were active enough to avoid capture. Other sheep were worse than on the night before, but after the experience of the two early cases I regarded them less seriously.

The bad cases were driven into a pen, and a dose of mag. sulph. administered, and mag. sulph. was added to the drinking water.

In a few days the flock was all right.

Examining the facts of the case it was evident that circumstances had tended to bring about a condition of thirst in the sheep —dry weather (meaning probably some fever), grazing on a waterless lane, the journey on dusty road. Arriving at the field, water was trickled into the trough, and although the quantity could not have been large because the barrel was a small one, it is possible it was cold.

It is evident that it was not the quantity of water taken that brought about blood dilution and allowed the escape of watery elements; but rather the coldness of the water, which produced nervous derangement and loss of control over the capillaries.

I have since learnt that sheep are particularly liable to this dropsy from drinking water, when heated, though it is not common in my district.

FIG. 1.—Showing Swelling of the Lips and Cheek.

FIG. 2.—Shewing Swelling of the Lips and Submaxillary Space.

INTERMEDIATE OBJECTS AS CARRIERS OF DISEASE.

By G. MAYALL, M.R.C.V.S.

If absolute cleanliness of the surroundings of a sick or diseased animal was promptly and effectively carried out, there would be little need to concern ourselves with any precautions to prevent the spread of contagion or infection through inanimate objects about or in contact with the subject. True hygiene will aim at limiting the deposition of infectious agents on a patient's entourage, and render those that arrive there as harmless as possible by a quick removal and subsequent sterilisation of the area or object involved. Cleanliness will always be the first and most useful handmaiden in preventing and checking the spread of disease. One of the objects of the notification of infectious maladies is to curtail the spread of centres of contagion, and to deal thoroughly and effectively with the abode of the afflicted. Hence in human medicine notification generally means removal of the patient to a more suitable dwelling, where all has been planned to deal well with the complaint from which the patient suffers. The room or house the ailing subject has left is dealt with by disinfection and sanitation. In our case we are often handicapped by the places in which our charges "live and move and have their being." Many of them, if not actual homes of disease, certainly cannot be described as aids to the overthrow of the spread of infection.

There has always been, even in normal times, a tendency to be somewhat lax in the carrying out of efficient control and supervision of the movements of large bodies of animals. Infection carriers have escaped observation until they have scattered in a lesser or greater degree the germs of disease. The inanimate objects with which they have come in contact at resting places, on roads, in carts or waggons, at lairages, on the railways, or on board ship, remain to infect subsequent animal passers-by. There are not a few diseases highly infectious, and quickly spread, where the people concerned are in no way urged or compelled to notify or take any precautions to prevent the spread of infection. If it can be shown them that great economic loss results to the country, to trade, or to commerce by the neglect of sanitary and hygienic precautions, their assistance and co-operation in overcoming the danger of the spread of disease through inanimate objects that carry or harbour the germs of contagion, will be willingly given. The control of measures of sanitation and hygiene must, however, be in the hands of men having an intelligent idea of the objects to be aimed at, and with full power to see that any regulations or instructions are adequately carried out.

On the return of animals and men from the war, the importance of attention to the cleanliness and disinfection of cars, trucks, yards,

stations, and boats will be very evident. Hygienic precautions in connection with a few diseases, such as influenza, strangles, ringworm, grease, etc. (maladies about which official regulations are strangely silent), will prevent much avoidable loss and increase the confidence of the public in the carrying companies, and those firms concerned in the trade and transit of the community. The expense involved in the carrying out of disinfection is no valid objection by companies or individuals to the duty which devolves upon them of preserving the health of animals and preventing the spread of contagious or infectious diseases.

Intelligent disinfection will only be carried out by a knowledge of the disease and organisms that are being dealt with, together with an understanding of certain fundamental facts in connection with the species of bacteria concerned. Thus Eugen Fröhner writes:—"Anthrax, tetanus, and black-leg spores, tubercle bacilli, lung plague, and rabies virus require strong disinfectants; whilst anthrax, swine erysipelas, glanders bacilli, foot-and-mouth, pox and rinderpest virus, require mild disinfectants."

Veranus A. Moore in "Infectious Diseases of Animals," writes that: "The failure resulting from the many efforts to disinfect stables, pens, kennels, and yards has caused much scepticism concerning the efficiency of many reported disinfectants." Efficient disinfection depends upon a knowledge of the action of the chemical on the bacteria to be destroyed, on variability of resistance in the same species, the material in which the bacteria exist, the temperature under which the disinfecting agent acts. "In many of the results the inhibiting action of the agent in question has been mistaken for its germicidal action." Briefly, in practical disinfection the litter and the floors and walls are the chief objects of attention. The first should be burnt, the floors and walls thoroughly cleaned. Hot soda solution is recommended to thoroughly scrub the floors and walls—afterwards the germicide is applied. The disinfectant should soak to the bottom of cracks and crevices, and if a gas is used interstices must be cleaned to allow of its free access.

POISONOUS PLANTS.

By NELSON S. MAYO, D.V.S.

THE writer has been particularly interested for many years in the subject of the poisoning of live stock by various plants obtained in pastures. The losses of live stock from this cause in the United States are considerable, particularly upon the ranges of the Western States.

The spring season is unusually dangerous, as animals crave for

green food, and will eat plants that they will not touch under normal pasture conditions. Some plants appear to be poisonous only at certain stages of their growth that are inert or so distasteful that animals will not eat them at other periods of growth. The cockle burr (*Xanthium Canadense*) only causes the death of stock when it is sprouting and reaches the two-leaved stage.

The physical condition of the animals also seems to be an important factor. If they are thin in flesh and the digestive tract is empty, the toxic effects of plants eaten is pronounced marked.

In addition to the therapeutic suggestions for the treatment by Fred C. Mahon, M.R.C.V.S., in the February number of the VETERINARY JOURNAL, I would call attention to the value of potassium permanganate in weak solution. This has been used for some years with very satisfactory results by veterinarians in the United States.

The California Experiment Station, in a bulletin on "Stock Poisoning Plants in California," recommend a combination of potassium permanganate and aluminium sulphate. They say:

"PERMANGANATE OF POTASH AS AN ANTIDOTE.

"More valuable by far than any of the above-mentioned remedies is permanganate of potash. This chemical was especially recommended by Chestnut and Wilcox in their pioneer work on the stock-poisoning plants of Montana, and though more recent investigations indicate that it is not so effective as they then supposed, it is nevertheless a very valuable remedy, especially in cases where other and more specific antidotes are unknown.

"Permanganate of potash, through its strong oxidising action, attacks and breaks down most of the plant poisons. This oxidising action is accelerated when the substance to be treated is acid in reaction. The contents of the stomachs of animals are very often only slightly acid, or, in some cases, may be even alkaline. Because of this fact it has been found advantageous to administer with the permanganate some other chemical which will increase the acidity. Sulphate of aluminium is used for this purpose, since it is easily administered and is not so dangerous as the acids themselves. Permanganate of potash and sulphate of aluminium are quite inexpensive and are carried by all druggists.

"In practice, it has been found that best results are obtained when equal amounts of the two chemicals are used. The table below indicates the dosage for adult animals. For younger stock the amount should be somewhat reduced.

"PERMANGANATE OF POTASH.

"Sheep and hogs.	Horses.	Cattle.
"grs. 5 to 10.	grs. 15 to 20.	grs. 30 to 50.

"Equal amounts of sulphate of aluminium are added.

"The thoroughly pulverised chemicals are first dissolved in a pint to a quart of pure hot water, and, after cooling, the solution is administered as a drench. Great care must be exercised to ensure complete solution of the permanganate, since any undissolved in crystals may lodge in the mucous membrane of the mouth and throat and set up a serious irritation. The powder should be added to the water, the solution thoroughly stirred and allowed to settle for several minutes; the solution is then drawn off and any dregs which may remain in the bottom discarded. All organic matter, such as sugar, syrup, etc., must be kept out of the liquid, and the water used should not be strongly alkaline."

"TIPS" ON CAMELS, FOR VETERINARY SURGEONS ON ACTIVE SERVICE.*

By A. S. LEESE, M.R.C.V.S.

(Continued.)

Impaction of Third and Fourth Stomachs.

In camels, there is but little constriction between these two organs, and they practically form one long chamber; but the character of the mucous membrane clearly maps out their actual areas in the chamber. Camels differ from cattle in that the normal contents of the third stomach are semi-liquid or soft, and that that organ can be acted upon by mag. sulph. I think that impaction of the fourth stomach always precedes an impaction of the third stomach in camels; it could hardly be otherwise. The condition may be brought about by extreme thirst, and possibly also from dietetic causes. It is also characteristic of soamin or atoxyl poisoning, when camels are accidentally overdosed during treatment for trypanosomiasis. There is constipation, with small, hard, dark, dry cylindrical pellets of dung at first, and later no dung is passed at all. There is little or no appetite, and rumination soon ceases and may give place to vomition. There are frequent spasms of pain, not violent as a rule; and a good deal of fidgetiness and moaning. Sometimes the impacted fourth stomach is perceptible by palpation behind the last rib on right side. If unrelieved, nervous symptoms follow; the camel is unable to co-ordinate his movements, and often falls when he tries to rise; and, later, he may be unable to rise. He may be three weeks in this condition before death takes place.

Treatment:—A dose of 2½ or 3 lb. mag. sulph. in plenty of water, and followed by frequent administrations of water, cures most cases if given in time. Food should be withheld until the bowels have begun

* For previous instalments, see page 79 (March), page 136 (April), page 167 (May), and page 214 (June).

to act. Failing this, linseed oil 2 quarts, or eserine and pilocarpine (2 grains each subcutaneously) may be tried. Relapse must be guarded against by observing the state of the dung during the six days following relief; if the pellets again tend to become hard and cylindrical, another purge must be given; and if mag. sulph. is used 1½ lb. will be enough, and the camel should receive rum, ammon. carb., or strychnine.

Diarrhœa and Gastro-enteritis may be set up by sudden changes of diet or grazing, mouldy fodder, or poisonous plants. Full justice cannot here be given to the consideration of the effects of grazing imported camels on certain plants which they have not been accustomed to; it is a common cause of indigestion and diarrhœa. Camels used to fresh water, and made to water from brackish wells, generally scour at first. Male camels when violently "musth" often have diarrhœa. Diarrhœa finishes off many camels exhausted by trypanosomiasis or by war conditions. The treatment for diarrhœa in camels is the same in principle and practice as in cattle. In all cases of diarrhœa, the tail should be tied to one side, for reasons which the novice will not take long to appreciate. Coccidiosis is supposed to have been seen in camels in East Africa, but this requires confirmation.

Abdominal Pain.—Colic is very rare in camels excepting when they are ration-fed. It is generally due to sudden changes of diet, or to sand. These cases are treated by purges and anodynes; mag. sulph. acts well in dietetic cases, but linseed oil and linseed tea are more suitable for "sand-colic." Chlorodyne, in ¾ to 1½ oz. doses, relieves pain; chloral hydrate, if used, should be given in solution, because if a bolus of it is broken in the mouth, the palatal expansion may become violently inflamed. In sand-colic, an enema-pump is useful. I have seen several cases of recurring abdominal pain in camels; some had had daily attacks for weeks before I saw them; the peculiar fact remains that mag. sulph. cured all these cases at once and permanently. I do not know what this disease is. In camel-practice, peritonitis must be looked for in every case of abdominal pain.

Peritonitis.—This disease, in the camel, is one that arises apart from traumatism, and unexpectedly, a fact which the camel veterinary surgeon should know. I have already given my views on its causation, viz.:—the penetration to the peritoneal cavity of bacteria from the intestine via the mesenteric glands damaged and perforated by linguatula larvæ, which glands, in health, would otherwise act as safety valves against the bacteria. The disease chiefly occurs in the rainy season, at which time camels seem to have least resistance to bacterial invasions. The disease occurs quite independently from trypanosomiasis and is in no way connected with that condition. The peritonitis may be acute or chronic. Acute cases die in three or

four days; violent continuous abdominal pain, high fever, tenesmus, and a characteristic respiratory movement, are the chief symptoms, generally enabling a correct diagnosis to be made at an early stage. The respiratory movement, which is diagnostic of this disease in camels, consists in a quick inspiration, a pause, and a quick expiration; the pause is made to try and delay the pain caused by the contraction of the abdominal muscles in expiration; respiration is as "thoracic" as is possible in this animal, and the belly is pendulous and not "tucked up."

Chronic peritonitis is one of the most horrible diseases imaginable; for it results in the formation of new tissue about the spirally arranged colon in the left flank, which gradually presses on this gut and eventually closes it completely, and the animal dies of gangrene and rupture of the intestine immediately anterior to the stricture. The symptoms shown are similar to those of acute peritonitis, but fever is not so high, and there is a complete stoppage of the bowels except for the passage of a little dung of the appearance and consistency of vaseline. In this form of peritonitis the camel lives in perpetual agony for as long as fifteen days. If any doubt as to diagnosis exists, a rectal examination will reveal the tumefied mass formed by the new tissue around the colon in the left flank; no one who has witnessed a camel suffering from this disease would refuse to take his coat off and make sure of the matter, so that the camel could be destroyed. There is no treatment for either form which does any good; diagnosis is easy, and affected camels should be destroyed as early as possible. Of course, peritonitis may also occur from traumatism, as in other animals, particularly after castration; I have seen it produced by pressure in a camel which died from enormous distention of the paunch with water taken after a long thirst; and on *post mortems* it will sometimes be found to have arisen from a pleurisy via the diaphragm. But the two chief things to remember about peritonitis in camels are:—

1. It occurs in these animals without warning.
2. The respiratory action is diagnostic.

Hernia.—Small ventral herniæ are not uncommon in camels, but I have never seen one interfere either with work or with health.

"*Staggers*" is most suitably dealt with under diseases of the nervous system; and *rheumatism* will be described when discussing lameness. Both these diseases of camels are of dietetic origin.

Liver-disease includes cirrhosis, hydatid disease and nodular disease; none of these are important enough to worry a veterinary surgeon on active service.

Diseases of Nervous System.

There are three characteristic camel-diseases which it is necessary to describe in detail under this heading, and they may be called

" Mad Staggers," " Cold-struck " and " Shivering," for the purposes of this article. But, of course, the camel suffers from certain other diseases involving marked disturbance of the nervous functions and which may be briefly dealt with first :—

Rabies and Tetanus have already been described.

Trypanosomiasis.—In this disease I have seen, more than once, an affected camel suddenly rise to his feet and rush out into the bush and fall dead. The blood swarmed with trypanosomes. This manifestation, however, is quite an uncommon one.

Cœnurus cerebralis.—A case is on record, but I have no information on it.

Locomotor ataxia.—This is seen as a symptom in impaction of third and fourth stomachs and in Soamin poisoning.

Concussion of brain.—I have seen this as a result of a camel falling against a tree. Symptoms as in other animals ; a purge was given and was followed by gradual recovery.

Apoplexy is the cause of death in most fatal cases of tympanitis in camels.

Satyriasis.—Occasionally camels may be met with which remain " musth " all the year round and are extremely vicious to man and beast. The excessive " rutting " amounts to mania in such cases. If they cannot be made tractable by castration, they are too dangerous to retain in military service.

Amaurosis will be dealt with under " Diseases of the Eye."

The three characteristic nervous diseases of the camel will now be described :—

" *Mad Staggers.*"—This is a dietetic disease and the pathological condition appears to be an acute congestion of the meninges. I have only seen it in grain-fed camels. It is rarely met with when actually travelling with camels, but generally on a day's halt. The best conditioned camels are the chief sufferers ; and the circumstance which is most liable to bring the disease on is a big feed of grain on an empty stomach (*i.e.*, after an enforced fast). Greedy camels which bolt their grain-ration and then start on their neighbours', are particularly prone to this disease. At first, the camel is unusually alert, restless, and noisy ; in a short time, he will appear to go " mad," will break away from his picket and dash about aimlessly all over the place. In this state, a camel may rush right through a thorn zariba, or collide with trees, other camels, etc. The eyes are amaurotic, and all the animal's actions are plainly purposeless (differing from violent rabies). Some cases may break away into the bush at top speed and get lost ; they may be found dead owing to falls or collisions, or may be discovered next day quietly grazing and recovered. Some camels which

fall to the ground early in the attack will struggle on the ground as though in an epileptic fit

Treatment consists in early purgation whilst the camel is in the alert, bellowing stage; afterwards it is difficult to administer a purge without danger of choking; indeed, you have to catch your camel first. Hypodermic purges are not very suitable, but may be tried at a pinch. The best purge, when it can be given, is mag. sulph., and the dose must be large to act on the bowels in this disease; 3 lb. is necessary. The camel may also be bled from the jugular to the extent of 1 gallon. The vein is easily raised by pressing the fingers upwards on the under surface of the neck to one side and about 4 inches below the larynx. Further treatment consists in preventing the animal from injuring himself and in applying cold water over the cranium. With early treatment most cases recover and are subsequently little the worse; but if the purge cannot be given quickly, many die, first becoming comatose.

Potassium bromide, 1 oz., or chloral hydrate, 1 oz., may be used in this disease, but the difficulty is to administer the drugs, owing to the state of the patient. Chloral hydrate should always be given in solution to camels and never in bolus.

"*Cold-struck.*"—I do not pretend that this is a good name for the disease about to be described, except that it indicates the sudden onset, and the popular opinion as to its cause, viz., exposure to cold winds. I have had a lot of these cases in my time, and have made it a rule to investigate the history of the camel in every case; and have come to certain conclusions, which, however, are very far from being a solution of the precise cause. These conclusions are:—

(i) Although the disease occurs in all sorts of camels, it is more common in riding-camels.

(ii) Cases occur at work, at rest, going down to water, after watering, in grain-fed camels and in those only living by grazing, in hot weather, in cold weather, in windy weather, and in the stifling calm of the hold of a ship at anchor near the Equator, in fat camels, and in thin camels.

(iii) Cases occur in camels quite free from trypanosomiasis as well as in camels with that disease.

(iv) The symptoms, sudden onset and course, seem to me to point to some local circulatory disturbance in the spinal cord not far from the medulla, and I suggest embolism.

(v) The disease is met with in all countries to which the one-humped camel is native. The disease has a sudden onset. The first symptoms may be nervous twitchings or jerky swayings of the neck, and partial paralysis of either a fore-limb or sometimes of both hind-limbs. But the paralysis quickly tends to become more general, and a typical

advanced case will be found sitting and unable to rise, and with a curious bulge of the neck towards one side. This bulge is seen in any disease in which there is great loss of power in the neck-muscles (thus, in approaching death, from any cause); but is particularly noticeable in "cold-struck," and people love to call it "wry-neck." The reason there is a bulge of the cervical vertebræ to one side is simply that the ligamentum nuchæ, which, in these cases, is practically the sole support of the head, is shorter than the column of bones, so that the latter sags to one side. Fatal cases die in coma. There is, in some cases, fever; in others, none. The camel does not look bad "about the head," and may take an interest in food until the muscular paralysis is advanced. Treatment is very efficacious if begun early. It consists in a preliminary large dose of Epsom salts (3 lb.); subsequently, administration of 4 oz. whisky or rum every 2 hours; keeping the body warm with blankets or jhools, and wrapping blankets around the neck for the same purpose; and preventing the camel from rolling over on to his side, in which position he sometimes gets his neck twisted under him and may suffocate. When the paralysis is complete except in the facial muscles, there is little chance of recovery; if the camel is to get the chance, his head must be supported on sandbags, or it will fall to one side. With early purging, camels often recover completely; the recovery is gradual and averages twelve days. There is, however, a good deal of loss of flesh to make up.

"*Shivering.*"—This disease closely resembles equine "Shivering" in some respects; it is more common in Indian camels than others, and here again I have noted a special tendency for riding-camels to suffer from it. It is of slow onset, and the chief symptom is a violent tremor of the muscles of quarters and buttocks when in the act of "barracking" or sitting. After a time, the hind-quarters show a definite weakness in addition to the "trembling," and, at a still later stage, the quarters and buttocks atrophy. There is no difficulty in progression; but the camel becomes unable either to rise or to barrack properly under a load, and towards the end cannot rise at all. This is a gradual disease which takes months, and even years, to develop itself. As in horses, "shivers" improve temporarily with rest and good feeding, but there is no real treatment. The disease occurs in camels free of trypanosomiasis; but that disease seems to predispose to it. Its cause is wrapped in mystery. The trembling in the muscles of young camels not fully trained must not be mistaken for "shivering."

DISEASES OF URINO-GENITAL SYSTEM IN MALE CAMELS.

I have no information to impart on kidney-disease, bladder trouble, or calculi; excepting that I can assert with confidence that they are of rare occurrence in camels.

Hæmaturia.—I have seen this from ecchymoses in camels far gone in trypanosomiasis; and have notes at home of several other cases, of which some recovered and some died, but few opportunities occurred for real investigation. I have suspected oxaluria as one cause. Hæmaturia has been noted by Cross in a camel with a tuberculous kidney.

Pigmented Urine.—Is of no consequence and is sometimes seen in camels eating mango leaves, or after receiving turmeric. The inside of the hind-legs is then found covered with yellow pigment from the urine.

Paraphymosis.—Treatment as for other animals.

Orchitis.—Camels which "do the splits" on slippery ground may come right down on their testicles without dislocating their hips, and orchitis results, also sometimes sprain of the adductors of the thighs. Recovery is the rule from both these injuries. Sometimes the skin of the scrotum sloughs and exposes the tunica vaginalis; castration may then be necessary, of one or both testicles. The scrotum is a common object of attack by musth camels. Here again, if the teeth puncture the tunica vaginalis, the testicle should be removed as soon as possible. The cord may be found so swollen and division of it has to be done so high, that an ecraseur or ligature is necessary before one can get on to healthy cord. A suspensory bandage is useful in all forms of orchitis in camels.

Chronic enlargement of testicle has been noted in Egypt by Mason, associated with *Filariasis.*

"*Scirrhus cord*" in camels has not the appearance of a botriomycosis infection. Veterinary surgeons should know that the *camel's penis* has an S-curve, as in the ox; that the glans has a peculiar structure nearer that of the ram than of any other species; and that the urethral opening is too small to admit anything larger in calibre than a knitting-needle.

(*To be continued.*)

Abstract.

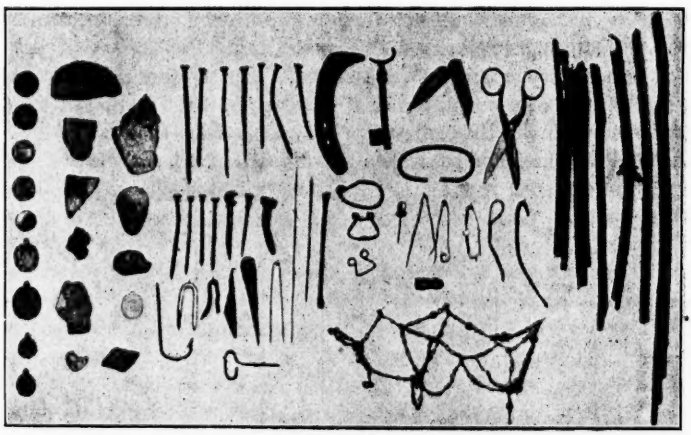
CURIOSITIES OF THE SLAUGHTER-HOUSE.

By E. TRULL,
Municipal Veterinary Surgeon, Barcelona.

E. TRULL has come across a curious collection of objects in different organs of the thoracic and abdominal cavities of cattle. He supplies a photograph of these, which we reproduce. Without exception, the foreign bodies piercing the heart and lungs have been pointed ones. They have been thrust forward by the contractions of

the stomachs, perforated the walls, crossed through the diaphragm, terminating their progress in the lungs, pericardium, or substance of the myocardium. In a certain number of cases they produced inflammation or abscesses at the spot of major or minor importance, according to the condition of the object.

Among the pointed objects may be recognised nails of various classes, fish-hooks, tie pins, needles for sewing pack saddles and leather work, scissors, parts of horse-shoes, forked sticks, etc., etc. Blunt objects remain in the stomachs, for preference the reticulum ; whilst those of small size, and any pointed ones, pass into the rumen. Figuring in the second classification were money, medals, stones, rags, remains of shoes, part of a cane, and a sufficiently large portion of a rosary.



Objects swallowed by Cattle.

Some of these objects have no doubt found their way into the condiments given to the cattle and others have been overlooked because no great care or cleanliness has been exercised over the food given. Their presence occasions ailments difficult to diagnose, on account of the vagueness of the symptoms. Few would suppose that a head of cattle could fall ill by the lodging in their organs of any of the many objects previously mentioned.—*Revista Veterinaria de Espana.* G.M.

Reviews.

ANNUAL REPORT OF THE CAMEL SPECIALIST FOR THE YEAR 1915–1916. Printed by the Superintendent, Government Printing, Punjab, Lahore. Price 3d. Obtainable from Messrs. Constable and Co., Orange Street, Leicester Square, and H. S. King & Co., Cornhill.

This is a very valuable and interesting report made by Mr. H. E. Cross, M.R.C.V.S., D.V.H., A.Sc., Camel Specialist. Mr. Cross has unique opportunities for studying the hygiene and diseases of camels. These are becoming more and more of vital importance as transport and troop animals, and their economic value to the countries in which they are indigenous necessitates a close study of their habits and ailments. The veterinary surgeon who is appointed to take charge of camels has none too many sources of knowledge to go to in order to obtain information concerning them.

A summary of mortality returns in the various camel corps is given, but as it is compiled largely from the reports furnished by camelmen, too much reliance cannot be placed on it.

The chief disease occurring was surra, 1,593 cases being diagnosed; whilst the total losses from death in eight camel corps were 2,500, or 22·7 per cent. Mr. Cross writes: "I have been unable to obtain evidence to substantiate the statement, made by many people, that the camel is a delicate animal; on the contrary, in my opinion, he is a very hardy animal, if worked in the climate he is accustomed to, and properly fed."

Surra is spread among camels by blood-sucking flies, and many anti-fly emulsion experiments were made. The results obtained by smearing with castor-oil were the most encouraging; but the expense incurred in the procedure make the smear of no practical value. Inoculation experiments indicated that the camel is susceptible to black-quarter, but trials made to determine its susceptibility to hæmorrhagic septicæmia were negative.

Missa, or moth bhusa, is used as a food for camels, and as green fodder, taramira-green, moth-green, and gram. To ascertain the amount of water they will drink they must be trained to take it from a bucket, and they must be allowed plenty of time, because they do not drink the whole lot straight away, but certain amounts at short intervals. The average amount of green food eaten when doing no work and receiving 6 lb. of gram is 66 lb.

The average amount of water when on green food, and doing no work, is 2¾ gallons, and when on grain and missa bhusa, and working moderately, 5 gallons, and after exertion, 8 to 9½ gallons.

Sore throat was treated by 1 to 2 lb. of Epsom salts, fomentations to the throat, protection from sun, and green fodder.

Jhooling—a contagious disease of camels (characterised by the formation of local tumours, hot and painful, terminating in suppuration and raw patches), is treated by excision, application of pure carbolic acid, blackwash, and Socins plaster, and placing the affected camel first or last in the string of camels according as the lesions are in the neck or hind quarters. Isolation of first case is

recommended and in examining camels for soundness none should be bought if small, hard, white spots (healed-up jhooling lesions) are observed on the skin.

Articular rheumatism is frequent in camels, muscular rheumatism absent or rare,

Wail is a disease characterised by loss of control of the hind quarters and difficulty in sitting down and getting up, whilst in walking the hind quarters sway from side to side. Grazing continually on lana, and shackling of the fore-legs of female camels, among which the disease chiefly occurs, are considered to be contributory causes of the ailment.

Two ounces of butter were obtained from 3 lb. of camel's milk after four hours' churning.

Outbreaks of disease among military camels were investigated at the request of the army authorities. Captain Ware, Officer in Charge of the Supply and Transport, Derajat Brigade, adopted the specialist's recommended treatment for surra, and cured 129 camels out of 158 treated. The drugs used were arsenic alone, and arsenic and soamin. It is stated by some camelmen that camels never recover from surra, but others asseverate that they do, and eleven camels are now being observed to determine the point.

Ponies were susceptible to camel surra, pus in the sinuses and cerebral symptoms being noted. Old camels are not immune to surra. There was an outbreak of surra at a camp at Chakdara, and tabanidæ were swarming at this camp. The specialist observes that " before sending a camel corps to any district where tabanidæ are known to be prevalent, every effort should be made to ascertain that no surra exists in the corps. Five out of fourteen ponies at the Chakdara camp became affected with surra: (1) Ponies can contract surra from camels; (2) ponies should not be kept in contact with camels.

Some sudden deaths amongst the camels in the 57th Silladar Corps were attributed to anthrax, and in Bhera Tahsil to " mad " surra, or anthrax.

Considering the wide area covered (Mr. Cross travelled 5,704 miles by rail and 2,445 by road) in making investigation and research, and the lucidity of the report on many ailments of camels, the author may be congratulated on doing extremely valuable and important work for the Empire, and the Government of the Punjab may be considered fortunate in having so strenuous and capable an official as Mr. Cross. The Hon. C. A. H. Townsend, I.C.S., promises to put before the Deputy Commissioners a request by the specialist, that steps shall be taken to get the Tahsildars to send in reports of all sudden deaths among their charges, so that the cases may be investigated.

G. M.

THE RHODESIA AGRICULTURAL JOURNAL. Edited by the Director of Agriculture, assisted by the Staff of the Agricultural Department, October, 1916. Published bi-monthly. Printed by the Argus P. and P. Co., Ltd., Salisbury, Rhodesia. Price 5s. per annum.

This periodical is well illustrated and printed, and full of useful

matter for the progressive agriculturists of the colony. It contains articles on cattle feeding, new crops, immunity, fertilisers in relation to rain, farm experiments, oil seeds, cow shedding and vermin. There is a reproduction of the first part of the article on "Immunity," by Mr. L. E. W. Bevan, M.R.C.V.S., which is well worth reading. The abridged veterinary reports for July and August, by Mr. J. M. Sinclair, Chief Veterinary Surgeon, appear in the journal. From them we gather that all the imported animals passed the tuberculin and mallein tests. Five bulls from Great Britain were subjected to inoculation against plasmosis, and when adequate accommodation is provided it is hoped that all suitable imported bulls will be subjected to innoculation as a protection from the disease.

To the layman or veterinarian interested in agriculture in the Colonies, the value of majorda melons as food for stock will be appreciated. The article on "Cow Shedding" is very readable, being written by Mr. R. C. Simmons, who also discourses well on a "Beef Feeding Experiment," at the Government Experiment Farm, Gwebi. The crop of majorda melons illustrated as being grown at the Premier Estate, Umtali, looks a fine and plentiful one. They are used as succulent food for stock, and we can quite understand their value and palatability to the animals. To us here the following would seem a queer ration to apportion for the making of beef:—Crushed maize, veld hay, oat hay, Napier's fodder, teff hay, velvet bean hay, green maize stalks, majorda melons, ground nuts; and yet, in a short feeding period of five months on this ration, very good profits were made on two groups, each consisting of eight bullocks. In February of last year these bullocks were purchased at £7 5s. per head. We could do with some at this price here just now.—G. M.

PERSONAL.

ONE of our very distinguished French colleagues, Professor M. E. Leclainche, who is now acting as Inspector-General and Chief of the Sanitary Service at the French Ministry of Agriculture, has been elected as a Member of the Academy of Science, in the place of the late Professor Chaveau. This is an honour much appreciated, both by the individual to whom it is given, and by the members of the Veterinary profession in France.

The following honours have been awarded by our Allies to members of the profession.

The Cross of the Legion of Honour:
Brigadier-General J. Moore, C.B.
(Director-General of the Army Veterinary Service in France).

Serbian Order of the Crossed Swords:
Brigadier-General R. C. Butler, C.M.G.

XUM

Officier de l'Ordre de la Merite Agricole :
Major E. M. Percy, M.R.C.V.S.

Croix de Guerre :
Major P. Argyle, D.S.O.

To be Members of the Distinguished Service Order :
Col. Axe, Col. W. Pallen, Lt.-Col. Matson, Major Kirby, Major Argyle, Major Andrews, Major A. Spreuil, Capt. Pryor.

Military Cross :
Capt. W. Mitchell, Capt. J. H. Taylor, Capt. C. H. S. Townsend, Capt. J. H. Stewart.

Obituary.

CAPTAIN BERNARD POOLE, CANADIAN A.V.C.

Born in England, the son of Major G. K. Poole, R.A.M.C., Capt. Poole was at one time a student in the Royal Veterinary College, London. He did not, however, complete his studies there, but went to Canada, where he graduated from Toronto and practised for ten or twelve years at Peterboro, Ontario, being appointed Veterinary Officer to the 3rd Canadian Dragoons (Militia). He was one of the Veterinary Inspectors in the Canadian Agricultural Department, and on the outbreak of war came to Europe with a Canadian Contingent as Veterinary Officer. Popular with his brother officers, the announcement of his death was received with much regret, and the Canadian Army Veterinary Corps has lost a very efficient officer. He was killed by a shell whilst on duty with his brigade, and was buried with full military honours in the cemetery adjoining the large town near which he was stationed at the time.

He leaves a widow, a daughter and a son, the latter at present serving in the Canadian Forces.

ERRATA.

In Professor Linton's paper on "The Dietetic Value of Wheat Bran," in The Veterinary Journal for June, the following misprints occur:—Page 192: 257,000,000 ft. tons should read 25,700,000 ft. lbs; 11,000,000 ft. tons should read 11,000,000 ft. lbs. and the two subsequent figures in the same paragraph should read ft. lbs.